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located, and the territory worthy of exploration is quite large.

F. W. WOLL,  
Secretary.

#### DISCUSSION AND CORRESPONDENCE.

##### STOMACH STONES.

THOSE who have been interested in two recent papers concerning pebbles found with the remains of ancient reptiles, may like to read the following: About fifty years ago, some dozen or more hogs were enclosed in a pen which extended into a mill race. The hogs were fed entirely with ground feed in variety—meal, bran, corn and oats or sweepings—but no clover, grass or vegetables, so-called. When slaughtered, there were found in the stomachs of several of the animals, pebbles enough in each to fill the two hands of a man, as well as smaller quantities in some instances. In these cases, this habit was attributed largely to the peculiar diet of the pigs.

W. J. BEAL.

TO THE EDITOR OF SCIENCE: A number of instances are claimed of the retention at the present time of habits acquired in former geologic epochs in adaptation to conditions then existent but now changed, rendering the archaic habits to-day useless or even injurious. Such, for example, is the habit of certain migratory birds, in crossing the Mediterranean Sea, of following a line of 'extinct islands'; also the habit of the lemmings of Scandinavia of periodically seeking the 'lost island of Atlantis.'

Is it not *perfectly evident* that in the habit shown by seals and sea-lions of ingesting pebbles we have a retention of an ancient custom dating from the days when seals had gizzards?

MAYNARD M. METCALF.

##### THE METRIC SYSTEM.

TO THE EDITOR OF SCIENCE: In the issue of SCIENCE of October 21, page 539, is a table of the height of African pygmies. This table is in British measures, and at the close of the article in which the table occurs is this statement: "In the writer's first description of these people in 1897 there occurs a mistake

made in the conversion of the metric system to English measure."

Now I am not strictly an anthropologist, but I am interested in some features of the study, and when I take up the more substantial books on the subject, I find the measures given are metric. As physical culture is one of the points that interest me, it would be a great advantage to me if Mr. Verner had published his figures in metric terms. There would then have been no mistakes, and comparisons would have been much easier for those who approach the subject from the cosmopolitan standpoint.

Is it not about time that a paper like SCIENCE, which professes to represent the science of this country, should show a preference for the measures employed by almost all scientific workers—to the extent, at least, of printing all quantities in both systems as the medical papers often do? The matter is becoming more and more important every day. See, for example, the embarrassment caused by the two systems of measure in preparing a map of the world, *National Geographic Magazine*, October, page 407.

WM. H. SEAMAN.

##### SPECIAL ARTICLES.

##### GOVERNMENT SUPERVISION OF HISTORIC AND PRE-HISTORIC RUINS.

THE traffic in prehistoric wares from the southwest that has arisen during the past few years, with the attendant destruction of prehistoric remains, has become a matter of great concern to archeologists, who appreciate the gravity of this loss to anthropological science. Even though much of this material gathered by parties who are only commercially interested in it, eventually finds its way into public museums, its value to science is greatly reduced because of the absence of authentic records. Fortunately, a growing popular and educational interest in historic and prehistoric landmarks has arisen to assist in the preservation of these objects.

As a citizen of New Mexico who has watched with deep concern the loss of many of the incomparable archeological treasures of the southwest, I have recently taken up in a

more serious manner than ever before an inquiry into the question of how these monuments may be permanently preserved and prehistoric relics protected at least long enough to permit of their scientific investigation. During the past few weeks, while pursuing certain lines of research at the national capital, for which the splendid resources of various government departments, bureaus, museums and libraries have been most courteously placed at my disposal, the opportunity has been given me to inform myself fully as to the care which the United States government has exercised over these ruins, is now exercising and stands ready to exercise whenever properly informed. The manifest desire to be informed, and the promptness with which information is digested and acted upon by the departments having jurisdiction over such matters are most encouraging.

In view of the fact that scientific bodies have come to take a commendable interest in this subject, and that various measures looking toward the protection and preservation of our prehistoric ruins have been and now are under consideration and may be brought before the national Congress next winter, it will be helpful in considering such measures to know that a wise and vigorous policy has been developed in the department of the interior with reference thereto. This policy, if vigorously pursued, practically accomplishes the ends to be desired and renders legislation of secondary importance. The following correspondence explains itself. I give, first, excerpts from a letter from the Honorable W. A. Richards, Commissioner of the General Land Office, under date of October 5, 1904.

PROFESSOR EDGAR L. HEWETT,  
WASHINGTON, D. C.

*Sir:* I beg to acknowledge the receipt of your letter of September 3, 1904, transmitting a memorandum relative to the historic and prehistoric ruins in Arizona, New Mexico, Colorado and Utah, and, also, of your letter, under date of September 14, 1904, in relation to proposed legislation for the protection of such ruins.

\* \* \* \* \*

This office fully appreciates the necessity for protecting these ruins and the importance of

furthering in every way possible, researches in connection therewith which are undertaken for the benefit of recognized scientific and educational institutions, with a view to increasing the knowledge of such objects and aiding in the general advancement of archeological science; and it desires to aid all such efforts to the full extent of its power, while, at the same time, endeavoring to effectually protect the ruins and relics on the public lands from ruthless spoliation by parties plying a trade in such matters.

\* \* \* \* \*

The need for adequate legislation on this subject has, accordingly, been called to the attention of congress by this department for a number of years, but as yet without avail.

In the meantime, every effort has been made to extend such protection to the various regions known to contain objects of interest as is possible without the requested legislation. Certain of the tracts have been protected from appropriation by being temporarily withdrawn from disposal under the public land laws. This action has been taken in the following cases:

In New Mexico: The Pajarito Cliff Dwellers' region, the Jemez Cliff Dwellers' region, the tract known as El Moro, or Inscription Rock.

In Colorado: The Mesa Verde Cliff Dwellers' region.

In Arizona: The tract containing the petrified forest; the greater portion of that part of the district designated by you as the Rio Verde district which lies outside of the Black Mesa Forest Reserve. This withdrawn area contains, among other ruins, the one known as Montezuma Castle.

\* \* \* \* \*

As regards the regions which you mention as containing ruins of known importance, which fall within the boundaries of tracts that have been permanently set apart as forest reserves, or just outside of the boundaries thereof, you are advised that they are, in consequence, under the care of the forest force patrolling the reserves, and that instructions have, at different times, been issued to the forest officers in respect to having a general care of these ruins. Further and more specific instructions will now be given in regard to their care, based upon the information furnished by you.

The several regions thus under the supervision of the forest reserve force fall within the districts designated by you as follows:

In the Gila River Forest Reserve, New Mexico: The greater portions of both the Upper Gila District and the San Francisco River District.

In the Black Mesa Forest Reserve, Arizona: A portion of both the San Carlos District and the Rio Verde District; which latter contains what is known as Montezuma Well.

In the San Francisco Mountains Forest Reserve, Arizona: A portion of the Flagstaff District.

\* \* \* \* \*

As yet, owing to the lack of sufficient available funds, it has not been practicable to place custodians in charge of the numerous and widely scattered ruins throughout the southwest, except in the case of three localities in Arizona. These cases are: The Casa Grande ruin; the Walnut Cañon ruins, lying partly within the San Francisco Mountains Forest Reserve; the ruins of Cañon del Muerto, within the Navajo Indian Reservation.

It is evident that immediate and effective measures should be taken by the government to protect regions containing objects of such great value to the ethnological history of this country and to other scientific studies;

\* \* \*

I am also heartily in accord with your recommendation that, while many of the tracts containing ruins and other objects of interest need only to be temporarily withdrawn and protected until the ruins and objects thereon have been satisfactorily examined and utilized, yet, certain of the most important of these regions should be preserved permanently as national parks, and that a general law be enacted, authorizing the establishment of such parks, and making provision for their proper protection and management.

\* \* \* \* \*

(Signed) W. A. RICHARDS,  
Commissioner.

The following orders were sent out by the commissioner of the general land office a few days subsequent to the above correspondence:

DEPARTMENT OF THE INTERIOR, GENERAL LAND  
OFFICE, WASHINGTON, D. C.

October 15, 1904.

MR. F. S. BREEN,  
FOREST SUPERVISOR,  
FLAGSTAFF, ARIZONA.

*Sir:* Your special attention is called to the historic and prehistoric ruins located in the San Francisco Mountains and Black Mesa Forest Reserves. As the ruins are almost entirely within said reserves, you are directed to exercise special care in their preservation. For your information in this matter I will state that there appears to be no special statute forbidding scientific research on the public lands, or requiring that

permission shall be obtained before undertaking the same or removing objects of value from the public domain. At the same time, however, independent of positive legislative provision in the matter, the United States has all the civil remedies, whether for the prevention or redress of injuries, which individuals possess. And, since all unauthorized excavations upon public lands which tend to the injury of same or of ruins or relics thereon, or the removal of objects of value or of scientific or historic interest, are in the nature of trespass upon the lands, all such intrusion upon public lands renders the parties to the trespasses liable to prosecution.

It is, therefore, deemed advisable that all persons wishing to explore and make excavations of the ruins referred to, should secure permission from the department. This office appreciates the importance of aiding in every way possible all examinations and gatherings of objects of interest upon the public domain, which are undertaken for the benefit of recognized scientific and educational institutions, while, at the same time, endeavoring to effectually protect the ruins and dwellings on the public lands from ruthless spoliation by parties plying a trade in such matters.

You are hereby directed to use your best efforts to carry out the wishes of the department in this matter, and so instruct your subordinates.

Very respectfully,  
(Signed) W. A. RICHARDS,  
Commissioner.

DEPARTMENT OF THE INTERIOR, GENERAL LAND  
OFFICE, WASHINGTON, D. C.

October 19, 1904.

MR. FRANK GRYGLA,  
SPECIAL AGENT, G. L. O.,  
SANTA FE, NEW MEXICO.

*Sir:* Your special attention is called to the subject of the unauthorized explorations and excavations of the historic and prehistoric ruins located upon the public lands for purposes of traffic in the curios, relics and objects of scientific and historic interest taken therefrom.

In order to prevent the further improvident spoliation and destruction of these ruins, and to restrict the explorations and excavations thereof to those made for the benefit of recognized scientific and educational institutions and objects, it is deemed advisable that all persons desiring to engage in such explorations shall secure permission therefor from the department before commencing their operations.

You will take prompt and appropriate measures to insure observance of the department's wishes

with respect to such of said ruins as may be upon public lands, including those temporarily withdrawn with a view to the creation of forest reserves, or for other purposes, in your territory, and you will render all practicable assistance to the forest reserve and Indian officers in their efforts to protect the ruins upon the lands under their supervision from unauthorized explorations and excavations.

If in any instance adequate protection to the public interests in connection with these ruins can not be obtained without recourse to legal proceedings, you will at once report the facts and the means of proving them to this office for consideration with a view to the institution of such proceedings. Very respectfully,

(Signed) W. A. RICHARDS,  
Commissioner.

Identical orders were sent to all forest supervisors and special agents of the general land office in the southwest. These orders cover not less than three fourths of all the ruins of New Mexico, Arizona, Colorado and Utah.

On or near all the important ruins that are situated on lands controlled by the General Land Office which have been withdrawn either permanently or temporarily the following notice, printed in conspicuous type on large sheets of tough white cloth, is kept posted by range riders and other officers:

WARNING:  
DEPARTMENT OF THE INTERIOR,  
GENERAL LAND OFFICE,

WASHINGTON, D. C., May 24, 1904.

Notice is hereby given that these lands have been withdrawn, for public purposes, from settlement, entry, and other disposal.

All persons are prohibited, under the penalty of the law, in such cases provided, from committing thereon any trespass whatever, and from working in any manner whatever any injury, waste, or damage of any kind to these public lands and to the timber, natural curiosities, caves, ruins, objects of antiquity, or any other public property thereon, and from removing or in any way disturbing the same.

W. A. RICHARDS,  
Commissioner of the General Land Office.

Approved: E. A. HITCHCOCK,  
Secretary of the Interior.

The following excerpts from a letter from Hon. A. C. Tonner, acting commissioner of

Indian affairs, set forth the policy of that department on the same subject:

DEPARTMENT OF THE INTERIOR, OFFICE OF INDIAN AFFAIRS, WASHINGTON, D. C.

October 22, 1904.

EDGAR L. HEWETT, Esq.,  
WASHINGTON, D. C.

Sir: This office is in receipt of your communication of the 17th instant,

\* \* \* \* \*

In reply you are advised that this office has been and is fully alive to the importance of preserving the various ruins and remains of antiquity scattered throughout the southwest, and has heretofore issued stringent orders to many of the Indian officials in charge of the reservations to which you refer—especially to those in charge of the Navajo, Moqui and Hualapi reservations. Quite recently this office, in order to prevent the spoliation of the prehistoric ruins in the cañons of De Chelly and Del Muerto, recommended to the secretary of the interior that a custodian be appointed to have charge of the ruins in the said cañons, and authority was granted by the secretary therefor and the custodian is now on duty.

In view of your present request the officials in charge of the various Indian reservations to which you refer have, in letters of this day, been advised relative to preventing further injury to ruins and suppressing the traffic in prehistoric pottery which may be found on the reservations under their care.

Their attention has been invited to the previous instructions of the office relative to this matter and they have been requested to use their best endeavors to keep out intruders and relic hunters and to see that such of the remains of antiquity as may be located within the reserves under their respective charges are kept intact until such time as proper scientific investigation of the same may be had. Very respectfully,

(Signed) A. C. TONNER,  
W.M.W.—L.M. Acting Commissioner.

Following is a copy of orders sent out from the office of Indian affairs October 22:

DEPARTMENT OF THE INTERIOR, OFFICE OF INDIAN AFFAIRS, WASHINGTON, D. C.

October 22, 1904.

JAMES B. ALEXANDER, Esq.,  
SUPERINTENDENT PIMA INDIAN SCHOOL,  
SACATON, ARIZONA.

Sir:

\* \* \* \* \*

It has been and is the policy of this office to prevent all unauthorized persons from entering

Indian reservations and despoiling historic or prehistoric ruins and taking therefrom any relics or remains of antiquity whatever. To this end your predecessors in office or perhaps you have heretofore been advised of the wishes of this office in this respect and requested to take such action as might be necessary to the end that proper protection should be afforded in the premises and all spoliation of these valuable ruins be prevented.

\* \* \* \* \*

It is desired that you take this matter up and issue such orders or instructions and take such action as may be necessary to carry out the wishes of this office as heretofore expressed. Should you have Indian police under your charge, they should be properly cautioned and instructed. Further, reliable and trustworthy chiefs and headmen of the tribe might likewise be advised of the desire of this office to protect these remains of antiquity from being despoiled by curio hunters, etc., and directed to aid you so far as possible in the matter.

Should unauthorized persons be found on the reservation or reservations under your charge and engaged in the work of excavating or collecting relics, etc., they should be removed from the reservation and the facts in the case be reported to this office in full.

Very respectfully,

(Signed) A. C. TONNER,

W.M.W.—L.M. *Acting Commissioner.*

In reply to a letter addressed to Mr. W. H. Holmes, chief of the Bureau of American Ethnology, inquiring what steps were being taken by that bureau with a view to putting the Interior Department in possession of information that would be helpful in carrying out the policy of the department relative to the southwestern ruins, I received the following communication:

SMITHSONIAN INSTITUTION,  
BUREAU OF AMERICAN ETHNOLOGY,  
WASHINGTON, D. C.

November 19, 1904.

My dear Mr. Hewett:

I beg to acknowledge the receipt of your letter of the 16th instant, making inquiries regarding the steps now being taken by the Bureau of American Ethnology in furnishing information to the Interior Department relative to the location, character, and condition of the various historic and prehistoric ruins of the Southwest.

In reply I have to say that much progress has

been made in the preparation of maps and descriptive lists of the various archeological sites of the Pueblo region. The Bureau has been conducting explorations among these sites at frequent intervals ever since its foundation, and has published numerous reports and maps embodying the results of its researches. The preparation of a general archeological map has been in hand for several years, and the data amassed is laid down on the Geological Survey maps, upwards of 50 of the topographical sheets covering parts of Utah, Colorado, New Mexico and Arizona having been utilized in this manner.

Accompanying the maps is a card catalogue of the sites, giving more or less complete data relative to the ruins and other remains. Recently a demand for this class of information has arisen in the Interior Department, and in order to properly meet this demand the work has been taken up afresh and reliable information from all sources is being brought together. The data previously collected is now being transferred to the latest editions of the maps on which we are laying down all Indian Reserves, private land grants, and township and section lines. Distinctive symbols are used for the various classes of remains, thus aiding in identification of particular sites; and the catalogue as recently remodeled, embodies a wide range of information, especially such as is likely to be of service to the Interior Department. The work is rapidly covering all the public lands on which archeological remains of importance occur and progress maps will soon be submitted for publication. Copies of these will, if deemed advisable, be placed in the hands of land surveyors, Indian agents, custodians of reservations, teachers, and others employed in the region or having knowledge of its ancient ruins, in order that all possible additions may be made.

It is expected that in a few years the record of our more important antiquities, already completed and published for the Mississippi Valley and the Gulf states, will be extended to cover the entire country.

I am enclosing herewith samples of the catalogue cards recently introduced. They provide spaces for recording data as follows: State, county, township, range, section, drainage; map (name of sheet), number of site, class or kind of remains, common or aboriginal name, where such exist, people, if known; needs of protection, of custodianship and repair; availability for research; history and bibliography.

The information thus gathered will be available for use by the Interior Department at an

early date, although the data with respect to many important sites will necessarily be imperfect.

Very truly yours,

W. H. HOLMES,  
MR. EDGAR L. HEWETT,  
U. S. National Museum.

*Chief.*

Identical orders were sent at the same time to superintendents of Indian schools, agents and additional farmers throughout New Mexico, Arizona and Colorado. These orders cover about one fourth of all the southwestern ruins. It will be seen that these various sets of orders from the two departments embrace practically all of the ruins that are not under private ownership.

It definitely mobilizes, so to speak, a force of forest supervisors, rangers, special agents, Indian school superintendents and teachers, Indian agents, farmers and police, and even enlists the Indians themselves, a particularly sagacious step, in the protection of these ruins for the avowed purposes of preserving them for scientific investigation. It establishes the broad and liberal policy that any competent scientist, who desires to place the material secured in a reputable public museum, will be authorized by the department of the interior to examine ruins, but that no person will be permitted to enter and excavate them for the purpose of acquiring specimens for traffic or private gain, and that willful destruction of valuable historic and prehistoric landmarks must cease.

Most archeologists will agree with Governor Richards that this subject calls for some judicious legislation, but they will be especially gratified to know that, pending such enactment, an efficient and economical policy has been developed in the department of the interior which is being made operative as promptly as circumstances will permit. The main thing, a system of governmental protection of archeological remains, is manifestly an accomplished fact, as much so, and after the same manner, as is the protection of timber on public lands. It will be effective just so far as the commissioners of the general land office and of Indian affairs are furnished with means adequate to carry the system into effect. It would now seem that all concerned

can best serve the interests of science and of the public by upholding this wise policy. I would further suggest that all workers in the southwestern field should make it their duty to keep the department of the interior informed of violations of the above orders which come to their notice and that they should henceforth refuse to purchase for museums any specimens or collections that are not secured by parties duly authorized to collect the same by the secretary of the interior. A specimen not secured by legitimate authority and not accompanied by authentic record should have no place in a reputable museum.

The bill proposed by Commissioner Richards as a substitute for all the pending bills on the subject is embodied in his annual report for 1904 to the secretary of the interior which can doubtless be had by addressing him. I regard it as a sound measure which provides in a simple and direct way for the end to be accomplished, and which should precede any further special enactments.

EDGAR L. HEWETT.  
LAS VEGAS, NEW MEXICO.

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NOTES ON THE HISTORY OF SCIENTIFIC NOMENCLATURE.

THEOPHRASTUS REDIVIVUS.

ALL who delight in contemplating the extraordinary attainments of the Hellenic mind, whether expressed in art, literature or science, will rejoice at the appearance of Dr. Hugo Bretz's learned treatise on 'Botanical Knowledge resulting from the Alexandrian Conquest.'\* This work of over 400 pages unquestionably ranks as the most critical and thoroughgoing discussion extant of the earliest botanical contributions that have come down to us from the olden time.

Naturally, the chief sources of material are those furnished by the writings of Theophrastus, disciple of Plato and Aristotle, and successor of the latter. Additional information of great value, especially as regards the extinct mangrove colonies along the Red Sea and Persian Gulf, to say nothing of general natural history, is contained in those oldest

\* 'Botanische Forschungen des Alexanderzuges,' Leipzig, 1903.